



299-E33-67 (A6875)

Log Data Report

Borehole Information:

Borehole: 299-E33-67 (A6875)		Site: 216-B-8 Crib			
Coordinates		GWL (ft)¹: Not Applicable		GWL Date:	
North 573778	East 137462	Drill Date Dec. 1947	TOC² Elevation 637.71 ft	Total Depth (ft) 150	Type

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Steel Welded	2.4	8 5/8	8	5/16	2.4	150

Borehole Notes:

The borehole was swabbed before collecting data, and no water was detected inside the casing. The logging engineer measured the pipe stickup at the borehole using a steel tape. Calipers were used to measure casing OD and thickness only; the casing ID is calculated. Stickup was measured between survey points marked on the casing. Zero reference is the top of casing.

Logging Equipment Information:

Logging System: Gamma 2B	Type: SGLS (35%)
Calibration Date: 09/00	Calibration Reference: GJO-2001-245-TAR
Logging Procedure: MAC-HGLP 1.6.5	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3	4	5
Date	09/17/01	09/18/01	09/17/01		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	2.5	153.0	94.5		
Finish Depth (ft)	28.0	94.0	26.5		
Count Time (sec)	100	100	30		
Live/Real	R	R	R		
Shield (Y/N)	N/A³	N/A	N/A		
MSA Interval (ft)	0.5	0.5	0.5		
ft/min	N/A	N/A	N/A		
Pre-Verification	B0052CAB	B0054CAB	B0054CAB		
Start File	B0053000	B0054000	B0054119		
Finish File	B0053051	B0054118	B0054255		
Post-Verification	B0053CAA	B0054CAA	B0054CAA		
Depth Return Error (ft)	0	N/A	0		

Log Run	1	2	3	4	5
Comments	No fine-gain adjustments made during this log run.	No fine-gain adjustments made during this log run.	Logging parameter change; depth interval exceeds 50% dead time. No fine-gain adjustments made.		

Logging Operation Notes:

Zero reference is the top of casing. The pre-calibration files (B0054CAB and B052CAB) passed verification criteria.

Analysis Notes:

Analyst:	Sobczyk	Date:	09/19/01	Reference:	MAC-VZCP 1.7.9 Rev. 2
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Pre-run and post-run verification spectra for the SGLS were evaluated. All of the spectra were within the control limits. The post-survey verification (file B0053CAA) was outside of the warning limits. The photopeak counts per second for the 1461-keV peak and the 609-keV peak were below the lower warning limits for this post-run verification spectrum.

Individual spectra were processed in batch mode using APTEC Supervisor. Concentrations were calculated in EXCEL, using parameters determined from analysis of calibration data collected in August 2000. The casing configuration was assumed to be one string of 8-in. casing with a thickness of 5/16 in. These assumptions are consistent with the logging engineer's measurements. Zero reference is the top of the casing.

Dead time was greater than 40 percent from 27.5 to 94.5 ft, and data from this region are considered unreliable. Dead time corrections were required where the tool was not saturated. At dead time greater than 40 percent, peak spreading and pulse pile-up effects may result in underestimation of activities. This effect is not entirely corrected by the dead time correction, and the extent of error increases with increasing dead time.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (^{40}K , ^{238}U , and ^{232}Th), and ^{137}Cs . For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable activity (MDA) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation.

Results and Interpretations:

^{137}Cs , which is a man-made radionuclide, was detected in this borehole. A zone of ^{137}Cs contamination was detected near the ground surface (log depth 2.5 through 9.0 ft) with activities ranging from 0.2 to 129.0 pCi/g. ^{137}Cs occurred between 25.5 and 127.5 ft. In this interval, activities exceeded 1,000 pCi/g between

29 and 95.0 ft. ^{137}Cs was detected at the bottom of the hole at 152.5- and 153-ft log depth with activities of 0.3 and 0.6 pCi/g, respectively.

A photopeak at 1408 keV was observed at 127.0 ft (file B0054052). Net gamma activity at this peak does not appear to be consistent with ^{238}U (^{214}Bi), as compared to the 609 and 1764 photopeaks. A possible candidate is ^{152}Eu . However, confirming peaks at 121.78 and 344.28 keV were not detected, and ^{154}Eu (1274 keV) was not detected.

Above the zone of intense gamma ray activity, apparent ^{40}K activities are about 12 pCi/g. Below this zone of intense gamma ray activity, apparent ^{40}K activities are about 17 pCi/g. The relatively high concentrations of ^{137}Cs below about 27 ft may correspond with the increase in ^{40}K activities and the transition from the coarse-grained sediments of the Hanford H1 to the finer grained sediments of the Hanford H2.

Because of the high activities encountered by the SGLS, the interval between 27.0 and 96.5 ft should be logged with the High Rate Logging System.

¹ GWL – groundwater level

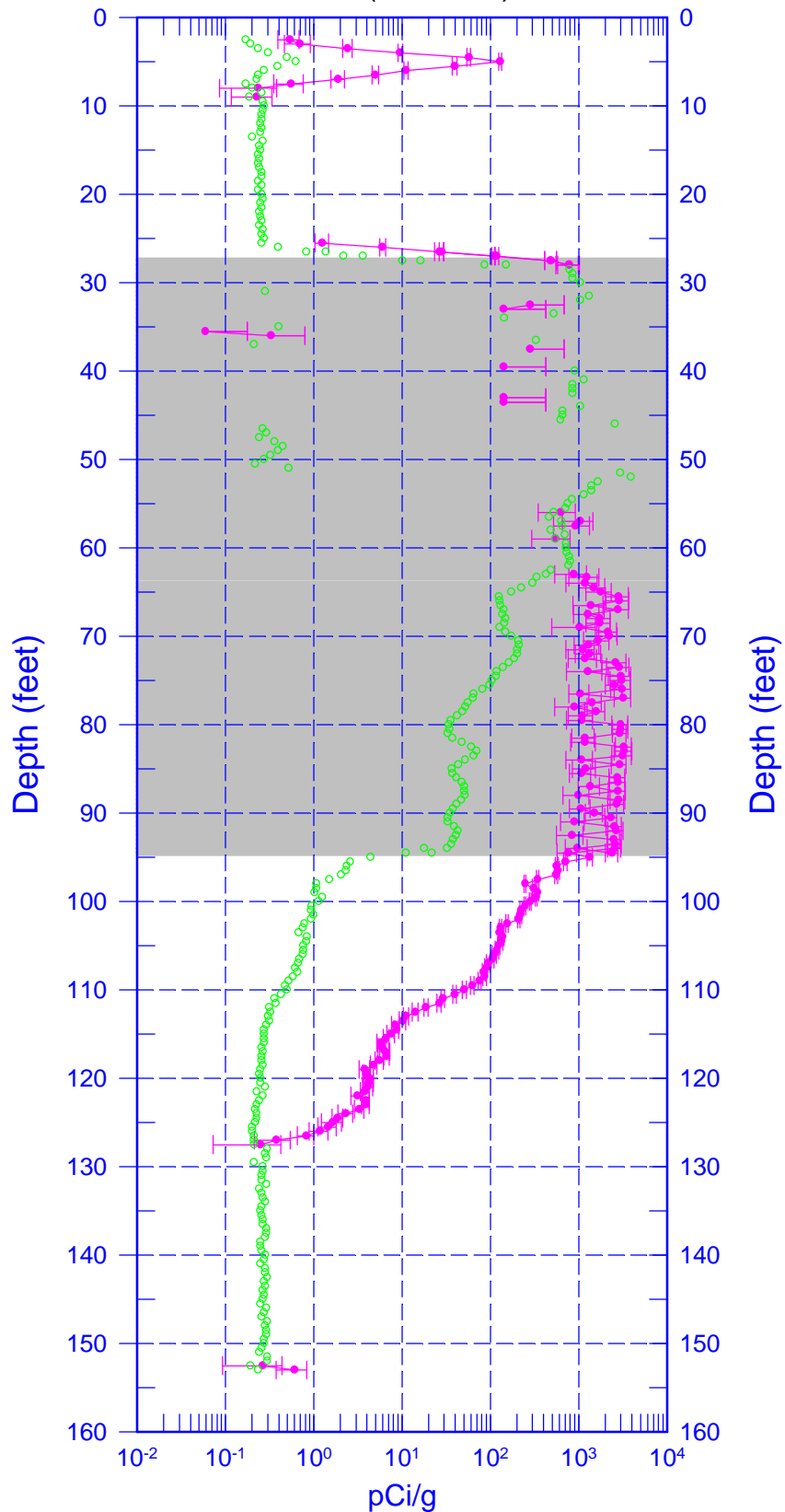
² TOC – top of casing

³ N/A – not applicable

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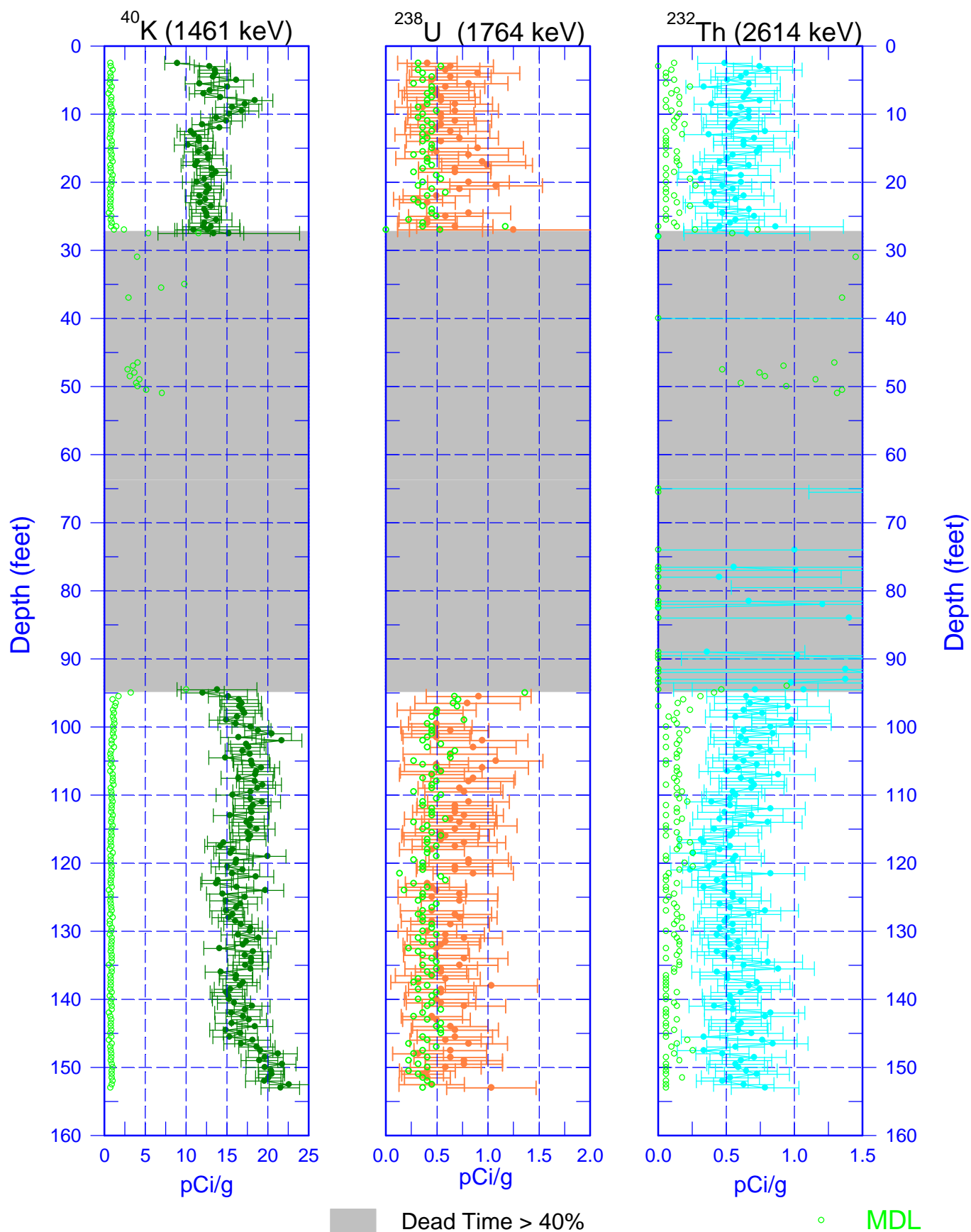
Man-Made Radionuclide

^{137}Cs (662 keV)

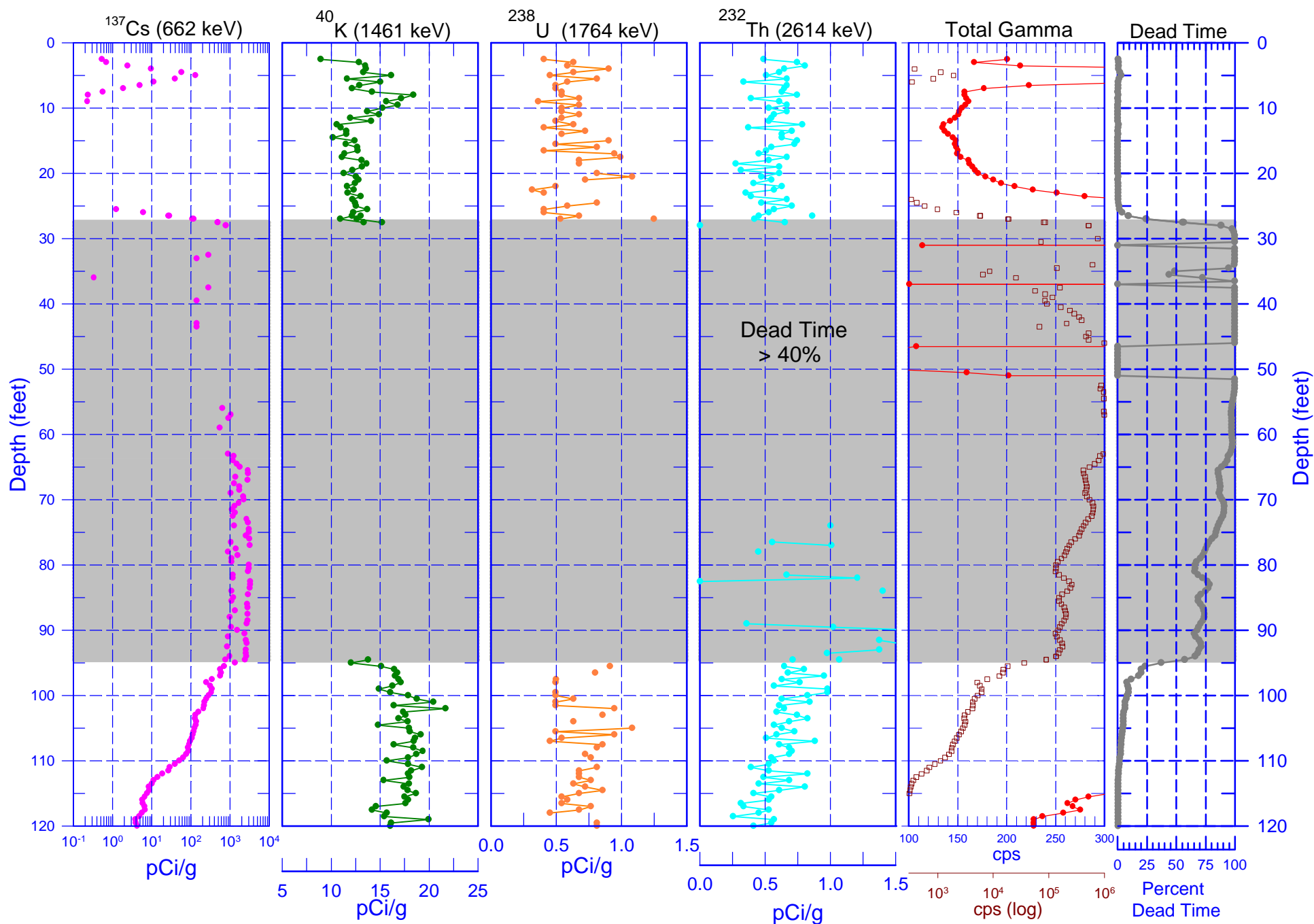


299-E33-67 (A6875)

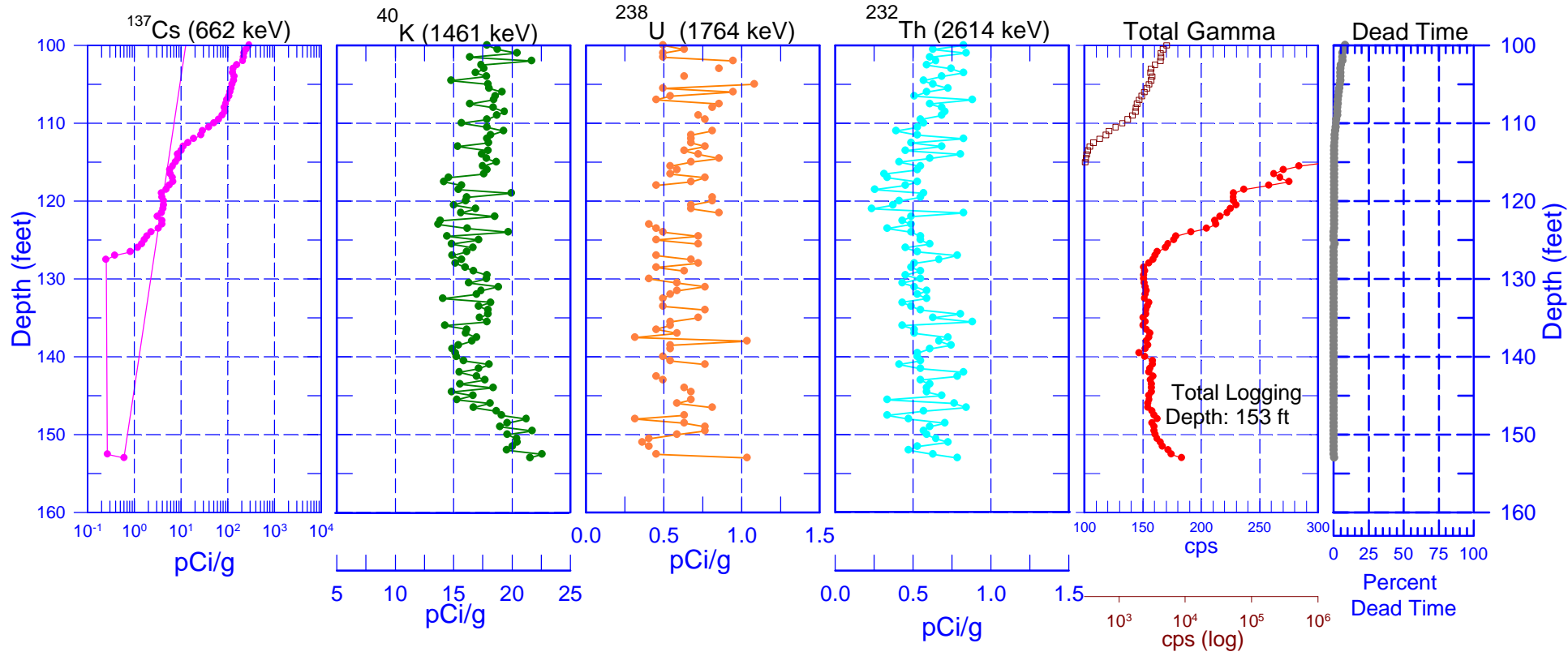
Natural Gamma Logs



299-E33-67 (A6875) Combination Plot



299-E33-67 (A6875) Combination Plot



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Total Gamma & Dead Time

